TECHNICAL SERVICE MANUAL

UNIVERSAL SEAL HEAVY DUTY PUMPS
SERIES 124A, 4124A CAST IRON
SIZES H, HL, K, KK, L, LQ, LL

CONTENTS

Mechanical Seal Pumps
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INTRODUCTION

The illustrations used in this manual are for identification purposes only and cannot be used for ordering parts. Obtain a parts list from the factory or a Sentinel representative. Always give a complete name of part, part number and material with the model number and serial number of pump when ordering repair parts. The unmounted pump or pump unit model number and serial number are on the nameplate.

UNMOUNTED PUMP		UNITS
PACKED	MECH. SEAL	**A** = Universal Seal Pump
H124A	H4124A	Units are designated by the unmounted pump model numbers followed by a letter indicating drive style.
HL124A	HL4124A	
	K4124A	
K124A	KK4124A	
	L4124A	
KK124A	LQ4124A	
	LL414A	
L124A		
LQ124A		
LL124A		

FIGURE 1 - SIZES H AND HL

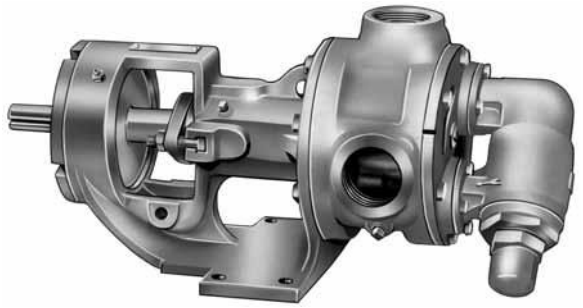


FIGURE 2 - SIZES K, KK AND L

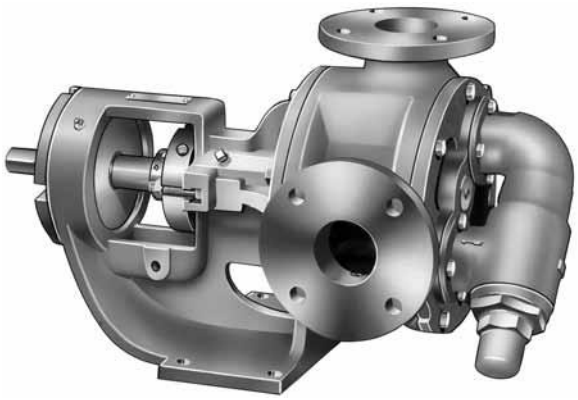
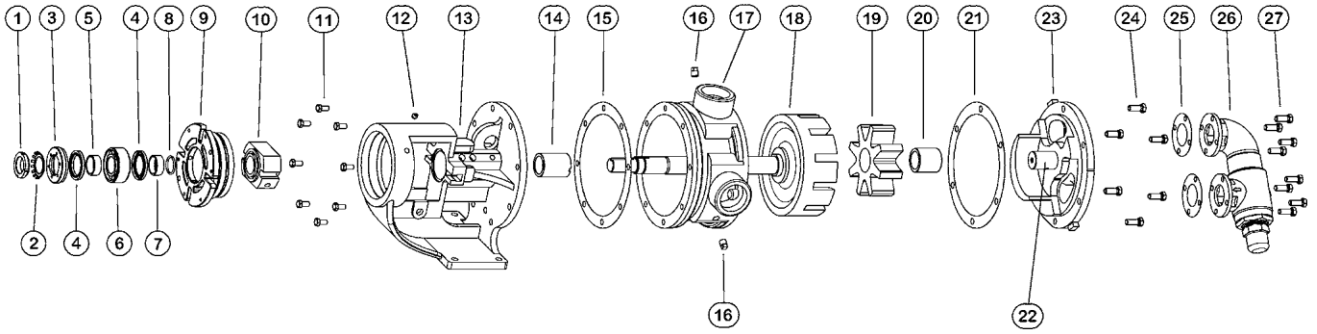


FIGURE 3 - SIZES LQ AND LL

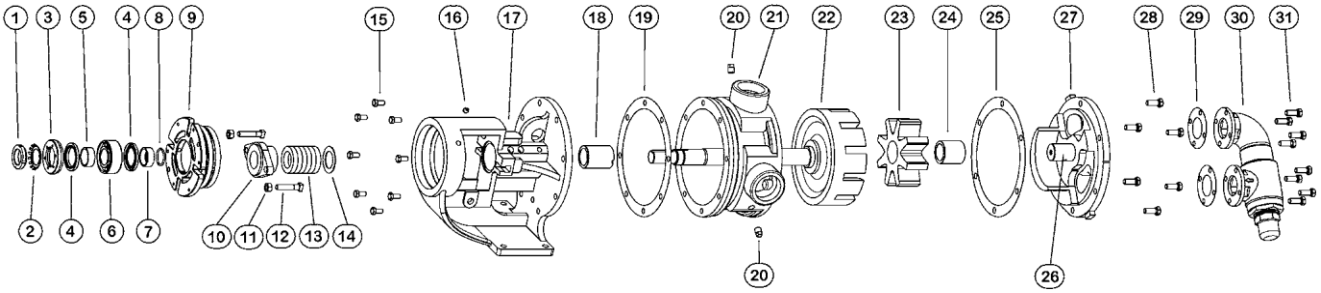
REPAIR: MODELS H, HL, K, KK, L, LQ AND LL
CARTRIDGE MECHANICAL SEAL PUMPS



ITEM	NAME Of PART	ITEM	NAME Of PART	ITEM	NAME Of PART
1	Locknut	10	Cartridge Seal	19	Idler and Bushing Assembly
2	Lockwasher	11	Capscrew for Bracket	20	Idler Bushing
3	End Cap	12	Grease Fitting	21	Head Gasket
4	Lip Seal	13	Bracket and Bushing Assembly	22	Idler Pin
5	Bearing Spacer Collar (Outer)	14	Bracket Bushing	23	Head and Idler Pin Assembly
6	Ball Bearing	15	Bracket Gasket	24	Capscrew for Head
7	Bearing Spacer Collar (Inner)	16	Pipe Plug	25	Relief Valve Gasket
8	Ring, Half Round (Not H, HL)	17	Casing (Tapped or Flanged)	26	Internal Relief Valve
9	Bearing Housing	18	Rotor and Shaft Assembly	27	Capscrew for Valve

FIGURE 4 - EXPLODED VIEW SERIE 4124A MODEL

REPAIR: MODELS H, HL, K, KK, L, LQ AND LL
PACKED PUMPS



ITEM	NAME Of PART	ITEM	NAME Of PART	ITEM	NAME Of PART
1	Locknut	12	Packing Gland Capscrew	23	Idler and Bushing Assembly
2	Lockwasher	13	Packing	24	Idler Bushing
3	End Cap	14	Packing Retainer Washer	25	Head Gasket
4	Lip Seal	15	Capscrew for Bracket	26	Idler Pin
5	Bearing Spacer Collar (Outer)	16	Grease Fitting	27	Head and Idler Pin Assembly
6	Ball Bearing	17	Bracket and Bushing Assembly	28	Capscrew for Head
7	Bearing Spacer Collar (Inner)	18	Bracket Bushing	29	Relief Valve Gasket
8	Ring, Half Round (Not H, HL)	19	Bracket Gasket	30	Internal Relief Valve
9	Bearing Housing	20	Pipe Plug	31	Capscrew for Valve
10	Packing Gland	21	Casing (Tapped or Flanged)		
11	Packing Gland Nut	22	Rotor and Shaft Assembly		

FIGURE 7 - EXPLODED VIEW SERIE, 124A MODEL

DISASSEMBLY

DANGER !

Before opening any Sentinel pump liquid chamber (pumping chamber, reservoir, relief valve adjusting cap fitting, etc.) Be sure:

1. **That any pressure in the chamber has been completely vented through the suction or discharge lines or other appropriate openings or connections.**
2. **That the driving means (motor, turbine, engine, etc.) has been "locked out" or made non-operational so that it cannot be started while work is being done on pump.**
3. **That you know what liquid the pump has been handling and the precautions necessary to safely handle the liquid. Obtain a material safety data sheet (MSDS) for the liquid to be sure these precautions are understood.**

failure to follow above listed precautionary measures may result in serious injury or death.

1. Mark head and casing before disassembly to insure proper reassembly. The idler pin, which is offset in pump head, must be positioned toward and equal distance between port connections to allow for proper flow of liquid through the pump.

Remove head from pump. Do not allow idler to fall from idler pin. Tilt top of head back when removing to prevent this. Avoid damaging head gasket. If pump is furnished with pressure relief valve, it need not be removed from head or disassembled at this point. **Refer to Pressure Relief Valve Instructions, page 11.**

If pump has jacketed head plate, it will separate from head when it is removed. The gasket between head and jacket head plate must be totally removed. Use new gasket when assembling pump.

2. Remove idler and bushing assembly.

3. Insert length of hardwood or brass through port opening between rotor teeth to keep shaft from turning. Bend up tang of lockwasher and with a spanner wrench, remove locknut and lockwasher from shaft.

4. Loosen two setscrews in the face of the bearing housing and remove the bearing housing assembly from the bracket. **Refer to figure 10.**

5. Remove pair of half round rings under the inner spacer collar from the shaft. There are no half round rings on the "H" and "HL" size pumps.

6. Carefully remove rotor and shaft to avoid damaging bracket bushing.

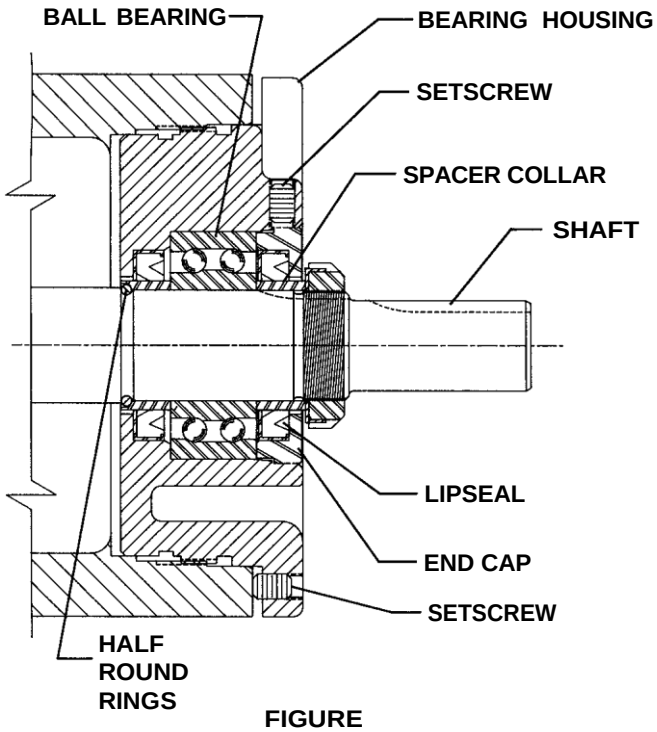


FIGURE 10

7. Loosen two radial setscrews in flange of bearing housing and with a spanner wrench remove the outer end cap with closure and outer bearing spacer collar.

8. Remove the double row ball bearing, closure and inner bearing spacer collar from the bearing housing.

9. Remove the rotary member of the mechanical seal from the rotor shaft. Remove the seal seat from the bracket.

10. Clean all parts thoroughly and examine for wear and damage. Check lip seals, ball bearing, bushings, and idler pin and replace if necessary. Check all other parts for nicks, burrs, excessive wear and replace if necessary.

Wash bearings in clean solvent. Blow out bearings with compressed air. Do not allow bearings to spin; turn them slowly by hand. Spinning bearings will damage race and balls. Make sure bearings are clean, then lubricate with light oil and check for roughness. Roughness can be determined by turning outer race by hand.

11. Casing can be checked for wear or damage while mounted on bracket.

ASSEMBLY

1. Install bracket bushing. If bracket bushing has a lubrication groove, install bushing with groove at 6.00 o'clock position in bracket. If carbon graphite, **Refer to Installation of Carbon graphite Bushings, page 11.** Make sure slots in the face of the bushing are towards rotor end of the bracket.

2. Clean rotor shaft and seal housing bore. Make sure they are free of dirt, grit and scratches. Gently radius leading

edge of shaft diameter over which seal is to be placed.

Never touch mechanical seal faces with anything except clean hands or clean cloth. Minute particles can scratch the seal faces and cause leakage.

3. Place tapered installation sleeve on the shaft. Coat tapered sleeve and inside of the rotary member with a generous quantity of light oil. Grease is not recommended. Start rotary member on shaft and over tapered sleeve. **Refer to figure 11.**

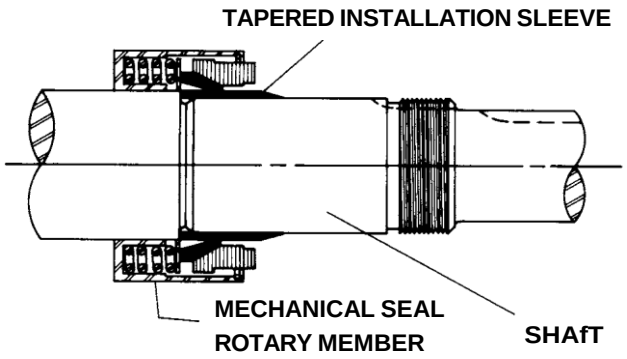


FIGURE 11

4. Move rotary member all the way on the rotor shaft until it is against the rotor hub. If the seal uses setscrews to secure the seal to the shaft, tighten the setsecrews once the seal is in place. Some PTFE seals are equipped with holding clips which compress the seal springs. Remove holding clips to release springs after seal is installed on shaft.
5. Lubricate outer diameter of seal seat gasket with oil. Press seal seat into bore until back, unlapped face bottoms in bore. Make sure the seat anti-rotation pins are aligned with slots in the bracket bushing.
6. Coat rotor shaft and face of mechanical seal with light oil. Start end of shaft in bracket bushing turning from right to left, slowly pushing rotor in casing.
7. Coat idler pin with light oil and place idler and bushing on idler pin in head. If replacing with carbon graphite bushing, **Refer to installation of Carbon graphite Bushings, page 11.**
8. Using a .010 to .015 inch head gasket, install head and idler assembly on pump. Pump head and casing were marked before disassembly to insure proper reassembly. If not, be sure idler pin, which is offset in pump head, is positioned toward the equal distance between port connections to allow for proper flow of liquid through pump. If pump is equipped with jacketed headplate, install at this time along with new gasket.
9. Tighten head capscrews evenly.
10. Slide inner spacer collar over shaft with recessed end facing rotor. H and HL size bearing spacer collars are not recessed.

    Place pair of half round rings on shaft and slide inner bearing spacer collar over half round rings to lock them in place. There is no pair of half round rings on the H and HL size pumps.
11. Install the lip seal (lip toward end of shaft) in the bearing housing and turn the bearing housing into the bracket.
12. Pack the ball bearing with grease, place on the shaft and push or drive into place in housing.
13. Install the lipseal (with lip toward end of shaft) and bearing spacer collar in the outer end cap and turn the end cap into the bearing housing until tight against the bearing. Lock in place with two set screws in the flange of the bearing housing.
14. Put lockwasher and locknut on shaft. Insert length of hardwood or brass through port opening between rotor teeth to keep shaft from turning. Tighten locknut to 50-70 ft.– lbs. Torque (H, HL) or 100-130 ft. – lbs. Torque (K, KK, L, LQ, LL) . Bend one tang of lockwasher into slot of locknut. If tang does not line up with slot, tighten locknut until it does. Failure to tighten locknut or engage lockwasher tang could result in early bearing failure and cause damage to pump.

    Remove length of hardwood or brass from port opening.

THRUST BEARING ADJUSTMENT SIZE H, HL, K, KK, L, LQ, LL PUMPS

1. Loosen the two set screws in the outer face of the bearing housing and turn this thrust bearing assembly clockwise until it can no longer be turned by hand. Back off counter-clockwise until the rotor shaft can be turned by hand with a slight noticeable drag.
2. For standard end clearance, back off the thrust bearing assembly the required length measured on the outside diameter of the bearing housing. **See Table 1.**
3. Tighten the two self-locking type “Allen” set screws, in the outboard face of the bearing housing, with equal force against the bracket. Your pump is now set with standard end clearances and locked.

   NOTE: Be sure the shaft can rotate freely. If not, back off additional length on outside diameter and check again.

PUMP SIZE	MODEL	STANDARD END CLEARANCE (Inch)	TURN BRG. HOUSING C.C.W. LENGTH ON O.D.	ADDITIONAL LENGTH ON O.D. BRG. HOUSING FOR .001” END CL.
H HL	124A 4124A	0.003	.75	.22
K,KK L,LQ LL	124A 4124A	0.005	1.25	.25

TABLE 1

4. High viscosity liquids required additional end clearances. The amount of extra end clearance depends on the viscosity of the liquid pumped. For specific recommendations, consult the factory. Each additional ¼" turn on the outside diameter of the bearing housing is equivalent to an extra end clearance of .001".

INSTALLATION OF CARBON GRAPHITE BUSHINGS

When installing carbon graphite bushings, extreme care must be taken to prevent breaking. Carbon graphite is a brittle material and easily cracked. If cracked, the bushing will quickly disintegrate. Using a lubricant and adding a chamfer on the bushing and the mating part will help in installation. The additional precautions listed below must be followed for proper installation.

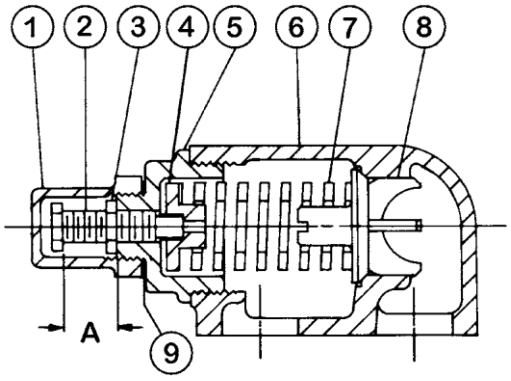
1. A press must be used for installation.
2. Be certain bushing is started straight.
3. Do not stop pressing operation until bushing is in proper position. Starting and stopping will result in a cracked bushing.
4. Check bushing for cracks after installation.

Carbon graphite bushings with extra interference fits are frequently furnished for high temperature operation. These bushings must be installed by a shrink fit.

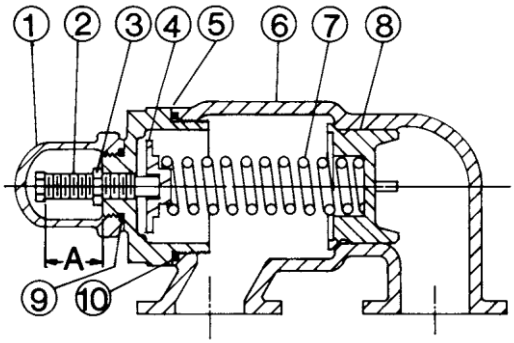
1. Heat bracket for idler to 750ºF.
2. Install cool bushing with a press.
3. If facilities are not available to reach 750ºF. temperature, it is possible to install with 450ºF. temperature; however the lower the temperature the greater the possibility of cracking the bushing.

Consult factory with specific questions on high temperature applications.

PRESSURE RELIEF VALVE INSTRUCTIONS



VALVE - LIST Of PARTS			
1.	Valve Cap	6.	Valve Body
2.	Adjusting Screw	7.	Valve Spring
3.	Lock Nut	8.	Poppet
4.	Spring Guide	9.	Cap Gasket
5.	Bonnet		



VALVE - LIST Of PARTS			
1.	Valve Cap	6.	Valve Body
2.	Adjusting Screw	7.	Valve Spring
3.	Lock Nut	8.	Poppet
4.	Spring Guide	9.	Cap Gasket
5.	Bonnet	10.	Bonnet Gasket

FIGURE 13
SIZES K, KK, L, LQ AND LL

DISASSEMBLY

DANGER !

Before opening any Sentinel pump liquid chamber (pumping chamber, reservoir, relief valve adjusting cap fitting, etc.) Be sure:

1. **That any pressure in the chamber has been completely vented through the suction or discharge lines or other appropriate openings or connections.**
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